DOCUMENT RESUME

ED 045 204 24 PS 004 021

AUTHOR	Bayder, Nicholas E.; And Others
TITLE	An Assessment of Cognitive Growth in Children Who Have Participated in the Toy-Lending Component of the Parent-Child Program.
INSTITUTION	Far West Lab. for Educational Research and Development, Berkeley, Calif.
SPONS AGENCY	National Center for Educational Research and Development (DHEW/OE), Washington, D.C. Division of Educational Laboratories.
REPORT NO	OCCAS-RR-4
BUREAU NO	BR-0-0481
PUB DATE	18 Jun 70
CONTRACT	OEC-0-70-3362
NOTE	12p.
EDRS PRICE	EDRS Price MF-$0.25 HC-$0.70
DESCRIPTORS	Concept Formation, *Intellectual Development, *Parent Education, *Parent Participation, Parent Role, *Preschool Programs, *Program Effectiveness, Tables (Data), Test Construction, Toys
IDENTIFIERS	Parent Child Course, Parent Child Program, Responsive Test, RT

ABSTRACT

This report is one of a series evaluating the Parent/Child Program. This program is designed to provide preschool education for 3- to 4-year-olds whose parents cannot afford nursery schools but yet are above the income level for Head Start participation. Two groups of parents participated in separate but equivalent Parent/Child courses in a classroom setting, 2 hours a week for 10 weeks, and were taught how to teach their children through the use of educational toys. All 31 children participating were pre- and posttested on the Responsive Test, developed to measure change in the intellectual development of children who have participated in a responsive environment. A variety of skills and concepts were tested on 13 subtests of the Responsive Test. Controls allowed for the effects of maturation and practice. For children in both groups of parents, there were significant differences on 9 of the 13 subtests. Of the other four subtests, two were at the maximum level on the pretest, and two measured factors for which the boys did not provide practice. It was concluded that the children learned a considerable amount over the 10 weeks of involvement in the Parent-Child Course and that a large portion of this learning can be attributed to the course itself. PS 004 022 is another report in this series. (NH)

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

DRAFT: FOR LIMITED DISTRIBUTION
NR/ee
6/18/70

ED045204

AN ASSESSMENT OF COGNITIVE GROWTH IN CHILDREN WHO HAVE PARTICIPATED IN THE TOY-LENDING COMPONENT OF THE PARENT-CHILD PROGRAM

OCCASIONAL RESEARCH REPORT NUMBER 4

Nicholas Rayder, Keith Alward, Glen Nimnicht

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY Glen Nimnicht

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE U.S. OFFICE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER."

INTRODUCTION

For the last few years, the staff at the Far West Laboratory has been engaged in the design of educational toys and accompanying learning episodes or "games." The latter consist of a series of problems or experiences which best utilize the educational potential of the toys. Although the toys and episodes are designed to fit into a variety of educational settings, we are presently concerned with their impact within the toy-lending component of the Parent/Child Course. Specifically, this paper reports the effect of these toys on the cognitive development of children whose parents have participated in the Parent/Child Course.

Briefly, the Parent/Child Course represents an effort to provide preschool experience for three- to four-year-old children of parents who cannot afford to send their children to a traditional nursery school and earn too much to send their children to Head Start. Parents meet in a classroom setting two hours a week for ten weeks with a member of the Laboratory staff or someone trained by the Laboratory.

PS004021

Sessions consist of films, discussions and written materials focusing on a variety of general child development topics. A portion of each session is devoted to a discussion of the specific problems and observations generated by the interactions between a parent add her child. Such discussions are directed by the staff member in order to provide information which will enhance the parent-child relationship.

Another major component of the program is the use of educational toys designed to facilitate the child's cognitive and personal development. During each weekly session, parents are given demonstrations and role-playing experience in the use of the specific toys and accompanying episodes they will play with their children that week.

Parents are encouraged to ask their child to play with the toy at least once a day for 20 minutes. If, on a given day, the child refuses the invitation to play, parents are advised not to force the issue but to try again on the following day. On the other hand, if at any time, the child asks to play with the toy, the parent is instructed to accomodate him.

DESIGN OF EVALUATION

Although the Parent/Child Course is designed to help the child in all areas of personal growth, we are presently concerned with the extent to which the Course can facilitate the child's intellectual growth. We wish to see whether the children involved in the Course have acquired certain target skills and concepts which they did not have before their experience in the toy-lending program and which the toys in the Course are designed to teach.

To answer this question, we employed a fairly straight-forward single group design with replication. First we pre-tested two groups of children from the same geographical area. After the parents of each group of children had participated in a separate Parent/Child Course, we posttested each group. We then compared the two sets of test results to see if the children involved in the Course had improved their scores on the items relevant to concepts taught by the toys they had played with.

A design of this type is often criticized, albeit sometimes tenuously, because it fails to control adequately for changes brought about by factors other than those specifically related to the treatment experience being evaluated. Educational experiences, however, can never be completely isolated from the everyday interaction between the child and his environment. Concepts and skills partially acquired within a formal educational setting may become functional in the everyday experiences of the child, while those tentatively acquired in daily activities may be strengthened by formal educational experiences. Hence, the only entirely accurate way to assure that changes in behavior are due just to specific experiences is to isolate the

child from all other conceivably relevant experiences. To do so when dealing with cognitive development is both practically impossible--a child can have cognitive experiences in the most barren of settings--and ethically repugnant.

The pre-test - posttest control group design with randomization, in which an experimental group is given training which a control group is denied, is an attempt to account for the problems in a test- treatment- retest situation. If only the experimental group changes in the ways the training is designed to produce, we can attribute the changes to the training. If, on the other hand, the control subjects show the same changes, then the effects of the training are negligible.

Yet in many situations, and this is one of them, the control group design is not appropriate. The question here is whether reliable changes are effected in children whose parents have participated in the Course. Such parents are automatically distinguished from a randomly selected control group of parents in comparable social groups: they are motivated enough to facilitate their child's development to participate in the Course. To have true control group design, therefore, we would have to give the Course to a randomly selected group of parents; this is impossible since we cannot expect unmotivated people to participate meaningfully in such a lengthy and taxing procedure. Another approach would be to identify two groups of similarly well-motivated parents and deprive one of them of the toy-lending component; such a procedure would obviously be ethically questionable.

Still, we must refine our design to make fairly reliable statements on our findings. And we must account somewhat for the effect of factors not related to the Course, including the possibility that the children's natural maturation over the period between pre- and posttesting accounts for score changes.

We believe that our design is adequate in both respects. That two separate groups of children were tested adds a replication factor to the basic design; parallel changes in the two groups would allow us to assert that score changes between the pre- and posttest are reliable and would give us more confidence that

changes were due to the Course itself rather than to idiosyncratic experiences of each child or group of children. Including items in the assessment instrument unrelated to skills taught by the toys in the Course provides a check of the maturation factor. If the changes in scores from pre- to posttest was primarily the result of maturation and the consequent improved ability to assimilate new concepts from everyday experiences, we would expect that scores would change similarly in items both related and unrelated to course content. Moreover, if the major variable accounting for score changes were learning to take the test itself, then children would improve on all items, including those unrelated to the Course.

METHOD OF TESTING

A. Test Sites: During the first three months of 1970, Parent/Child Courses were held in two separate school districts in metropolitan Salt Lake City. One of these was the Jordan School District; there, classes comprised of lower-income parents were held at the Midvale School. The second test site was in the Murray School District, at the McMillan School. Participants in these classes were middle- to high-income families.

In both districts, classes consisted of small groups of three to four parents who met once a week for ten weeks. All courses were taught by Mrs. Peterson, who was trained by the Laboratory to conduct Parent/Child Courses.

B. The Responsive Test: To measure change in the children's intellectual development, the Responsive Test was administered to children of all parents in the Parent/Child Course. The Responsive Test was especially developed for the assessment of intellectual development in children who have particiapted in a Responsive Environment.[1] After an extensive review of existing tests, it was decided that no single instrument was completely acceptable for assessment of achievement of children in the Responsive Model. The Responsive Test was developed to fill this need. Some of the items were selected from existing batteries. For example, test items dealing with letter

---

[1] Nimnicht, G. P., etal, The New Nursery School, General Learning Corporation, New York

recognition were adapted from the Metropolitan Reading Readiness Test, and other items dealing with color and shape were adapted from the School Mathematics Study Group. Other items were especially designed for use in the instrument.

The final instrument used in the Salt Lake City testing consisted of thirteen subtests dealing with the following areas:

1. Color Matching. The child is asked to match each of nine different color cards with one of a series of sample cards.
2. Color Naming. The child is asked to give the color name of each of the nine specific color cards.
3. Color Identification. The child is asked to select one of the nine colors as the relevant color is named by the tester.
4. Shape Matching. (Same as color matching--using four shapes.)
5. Shape Naming. (Same as color naming--using four shapes.)
6. Shape Identification. (Same as color identification--using four shapes.)
7. Letter Recognition. The first part requires the child to point to a specific letter in an array of five letters. The second part requires the child to select from a number of letters the one which begins a word verbally offered by the tester. For example, the child is asked to "point to the first letter in the word NO."
8. Numerical Concepts. This subtest first requires the child to identify and write numerals and to count. The harder items require manipulation of simple numerical concepts. For example, the child is asked to "Add the right number of blocks to your row to give it the same number of blocks as this row."
9. Relational Concepts. Here the child must recognize the relational words such as "longer," "beneath," "middle," etc., and to choose from among several pictures the one which best illustrates the concept.

PS 004021

10. Sensory Concepts. These items assess the child's knowledge of words describing tactile, auditory, and taste sensations as illustrated by appropriate pictures.

11. Problem Solving. This subtest requires that the child recognize similarities and differences in color, shape, and size and that he use these discrimination skills to extend patterns.

12. Verbal Communication. The child is presented each of four objects and asked to "tell me about this." One point is scored for every bit of information he can relate regarding each object within sixty seconds. Points are also given for the use of complete sentences.

13. Verbal Comprehension. This subtest assesses the child's ability to derive meaning from verbally presented material. The child may either nod or shake his head, or make verbal responses to such questions as: "Do shoes eat?", "Do brooms sweep?", etc.

While many achievement tests yield a total score, this is not true of the Responsive Test. Separate scores are reported for each of the subtests. The test is individually administered and takes from thirty to forty minutes to complete.

C. Testing Procedures: A few days before the Course actually begins, parents in both districts were asked to bring their children to their respective meeting places. Mrs. Peterson, who had been trained in the administration of the Responsive Test, individually tested the children in both districts. In the week before the courses began, 16 children were pre-tested in the Murray District and 15 in the Jordan District. Posttests were administered at the end of the course to as many of these children as possible. All children were posttested ten weeks after pre-testing.

RESULTS

Pre-test results were used to obtain an index of test reliability. A split-half (odd-even) reliability coefficient of .98 (corrected using the Spearman Brown formula) was obtained on the pre-test results of 31 children.

Next, test results were summarized for each group and for each subtest. Of the 31 children that began the program, complete pre- and posttest scores were available for only 12 Murray and 7 Jordan children.

The summary data are reported by subtests in Table I for the Murray group and in Table II for the Jordan group. In both tables, the range, average score, and variance are reported for pre- and posttest data. In addition, the total number of possible points for the subtest, a correlation between the child's pre-test and posttest score and a t statistic reflecting the change, with an indication of its significance, are also shown. The t statistic is the one calculated for repeated measures, and significance has been indicated at the .10, .05, and .01 levels for a one-tailed test with 11 and 6 degrees of freedom respectively for the Murray and Jordan groups.

Figures 1 and 2 were constructed to depict the data graphically. Figure 1 shows the range of scores for each subtest on pre- and post- Course administrations to the Murray group. For each subtest, the broad lines indicate the middle 67% of the test scores, the upper and lower two scores having been removed.

Similarly, Figure 2 shows the test score distribution of the Jordan children. Here, the broad lines indicate for each subtest the limited range of five children, the highest and lowest scores having been removed.

As indicated in Table I and shown in Figure 1, the Murray children scored high on the pre-test on both the Color Naming and Shape Naming subtests. Because of the high initial scores and limited variability of these scores, change was negligible and test of significance were not determined for these two subtests. Table II and Figure 2 indicate that the Jordan children also found the two subtests easy on the pre-test and that consequently there was again little change on them.[2]

---

[2] The Responsive Test has been revised and now is more challenging in these two areas; it includes 12 colors and 14 different shapes.

TABLE I

SUMMARY PRE- AND POST RESPONSIVE TEST DATA WITH INDICATIONS

OF CHANGES FOR 12 MURRAY CHILDREN

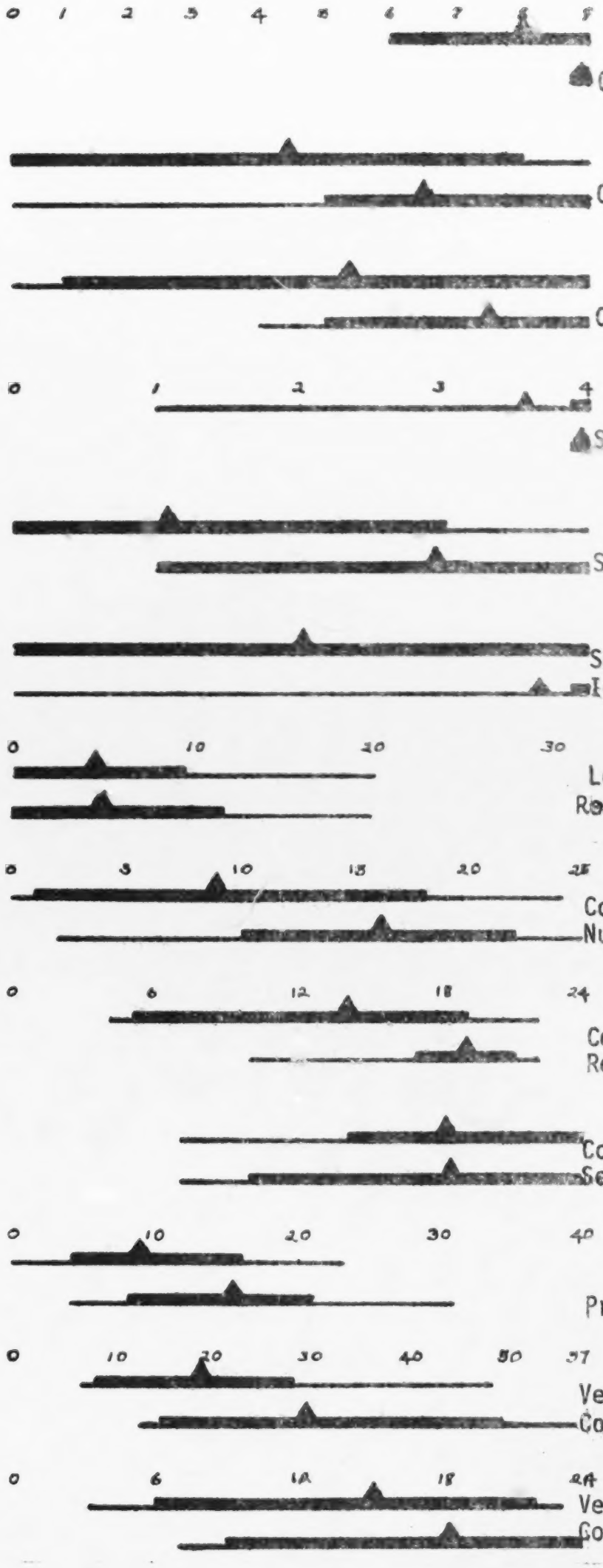
SUBTEST	Total Possible	PRETEST Range	Mean	Var.	POSTTEST Range	Mean	Var.	r	t	Sig. Level
Color Matching	9	6 - 9	8	2	--	9	0	--	--	--
Color Naming	9	0 - 9	4	13	0 - 9	6	8	.67	2.58	.05
Color Ident.	9	0 - 9	5	13	4 - 9	7	4	.92	3.55	.01
Shape Match.	4	1 - 4	4	1	--	4	0	--	--	--
Shape Naming	4	0 - 4	1	2	1 - 4	3	1	.20	3.36	.01
Shape Ident.	4	0 - 4	2	3	0 - 4	4	1	.00	2.76	.01
Letter Recog.	32	0 - 20	5	44	0 - 20	5	47	.60	0.31	
Num. Concept	25	0 - 24	9	72	2 - 25	16	51	.79	4.77	.01
Relat. Concept	24	4 - 22	15	39	10 - 22	19	13	.86	3.81	.01
Sensory Concept	24	8 - 24	18	25	8 - 24	18	33	.26	0.12	
Prob. Solve.	40	0 - 23	9	42	4 - 31	16	68	.50	3.05	.01
Verb. Comm.	--	7 - 47	18	145	13 - 57	30	227	.46	2.83	.01
Verb. Compre.	24	3 - 23	15	51	7 - 24	19	43	.64	2.32	.05

TABLE II

SUMMARY PRE- AND POST RESPONSIVE TEST DATA WITH INDICATIONS

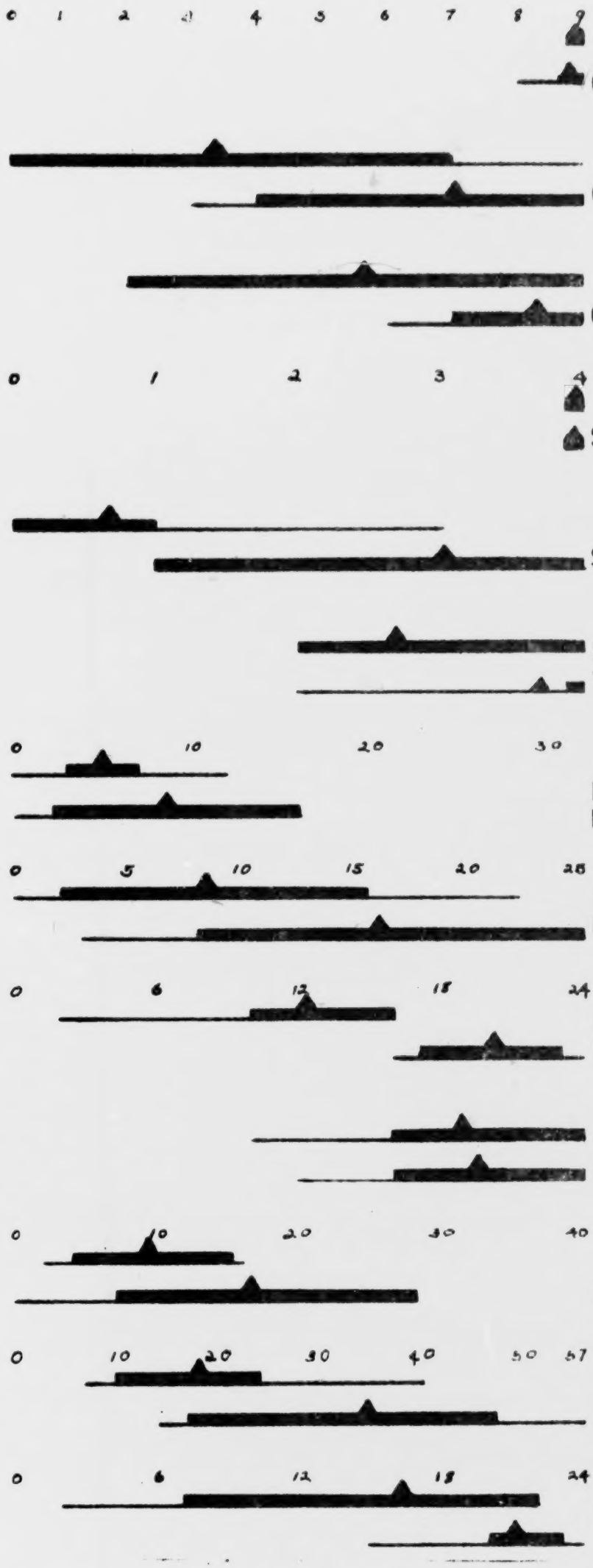
OF CHANGES FOR 7 JORDAN CHILDREN

SUBTEST	Total Possible	PRETEST Range	Mean	Var.	POSTTEST Range	Mean	Var.	r	t	Sig. Level
Color Matching	9	--	9	0	8 - 9	9	0	.18	--	---
Color Naming	9	0 - 9	3	14	3 - 9	7	6	.48	2.73	.01
Color Ident.	9	2 - 9	6	10	6 - 9	8	1	.66	2.54	.01
Shape Matching	4	--	4	0	--	4	0	--	--	--
Shape Naming	4	0 - 3	1	1	1 - 4	3	2	.42	4.49	.01
Shape Ident.	4	2 - 4	3	1	2 - 4	4	0	.40	2.27	.05
Letter Recog.	32	0 -12	5	13	0 -16	8	37	.30	1.27	
Num. Concept	25	0 -22	9	57	3 -25	17	82	.87	4.29	.01
Relat. Concept	24	2 -16	12	22	16 -24	20	8	.87	4.29	.01
Sensory Concept	24	10 -24	19	21	16 -24	20	17	.22	0.39	
Problem Solve.	40	2 -16	10	25	0 -28	17	110	.80	2.59	.01
Verb. Comm.	--	7 -40	18	110	14 -40	35	212	.20	2.51	.01
Verb. Compre.	24	2 -22	16	60	15 -24	21	8	.86	2.12	.05



SUBTEST	MEANS Pre	MEANS Post	SIG. LEVEL
Color Matching	8.1	9.0	—
Color Naming	4.4	6.5	.05
Color Identifying	5.3	7.5	.01
Shape Matching	3.6	4.0	—
Shape Naming	1.2	2.9	.01
Shape Identifying	2.0	3.7	.01
Letters--Recognition	4.8	5.4	N.S.
Concepts--Numbers	8.5	16.0	.01
Concepts--Relational	14.7	18.9	.01
Concepts--Sensory	18.0	18.2	N.S.
Problem Solving	8.7	15.7	.01
Verbal Communication	18.2	30.3	.01
Verbal Comprehension	15.2	19.2	.05

Figure I. Range and Means for Pre- and Posttest Responsive Test Scores for 12 Murray children. Blocked in area represents middle 67% of children's scores.



SUBTEST	MEANS Pre	MEANS Post	SIG. LEVEL
Color Matching	9.0	8.8	___
Color Naming	3.4	7.1	.05
Color Identifying	5.7	8.3	.05
Shape Matching	4.0	4.0	___
Shape Naming	.7	3.0	.01
Shape Identifying	2.7	3.7	.05
Letters--Recognition	5.3	8.4	N.S.
Concepts--Numbers	8.7	16.6	.01
Concepts--Relational	12.4	20.4	.01
Concepts--Sensory	18.8	19.7	N.S.
Problem Solving	9.7	17.1	.05
Verbal Communication	18.0	34.6	.05
Verbal Comprehension	16.4	21.1	.05

Figure 2 Range and Means for Pre- and Posttest Responsive Test Scores for 7 Jordan children. Blocked in area represents middle 71% of children's scores.

For the rest of the subtests, significant changes were shown by the Murray children on all except the Letter Recognition and Sensory Concept tests. On these tests, only small non-significant positive changes were shown. The Jordan results on these two subtests were similar: of 32 possible points on the Letter Recognition subtest, the pre-test average was five and increased only three points to the posttest average of eight; the average Sensory Concepts score increased only one point between administrations. The changes on both tests proved to be not significant.

Both the Letter Recognition subtest and the Sensory Concepts one deal with concepts not taught by any of the learning episodes presented in the Parent/Child Course. Thus, the failure of the children at both sites to show any significant change on either of these tests after the Course strongly suggests that the significant changes shown in the rest of the tests for which a test of change was appropriate were indeed due to the child's involvement in the ten week Parent/Child Course.

DISCUSSION AND CONCLUSIONS

The results generated by administering the Responsive Test before and after the Parent/Child Course were very similar at the two sites. Both the Murray and Jordan groups of children had developed color and shape matching skills before the Course began. The two groups showed similar scores on the pre-Course and on the post-Course test for each of the subtests; consequently each group demonstrated a comparable amount of change between administrations on respective subtests.

Further, neither group of children made significant gains in two areas not reflected in the Parent/Child Course. Children's average scores in each of these areas, Letter Recognition and Sensory Concepts, were quite stable over the ten week period. These two subtests served as internal controls. That is, if the learning that occurred was unrelated to the Course, or if the change in test scores was merely a matter of pre-test sensitization, we would expect a change in these two subtests comparable with that recored in the other subtests.

Such a statement, of course, assumes that the Letter Recognition and Sensory Concepts subtests were about as difficult for the children before the Course as those for which significant changes were shown. The test data confirm the necessary assumption: Letter Recognition pre-test scores seem comparable to the Problem Solving and Verbal Communication scores, while the Sensory Concepts pre-test scores are closely parallel to those made on the Verbal Comprehension subtest before the course.

The similarity of all results between the Murray children and a replicant groups of children in the Jordan School District and the failure of both groups to show significant change on two subtests unrelated to the Course substantiate the conclusions that (1) the children learned a considerable amount over the ten weeks of involvement in the Parent/Child program and (2) that a large portion of what they did learn over this ten week period can be attributed to the Parent/Child Course itself. These conclusions need to be re-examined with larger groups of children if possible. We plan to do this in the future at other locations where the Parent/Child Course will be offered.